

# Predicting the Crack Growth Behavior in a Filled Elastomer



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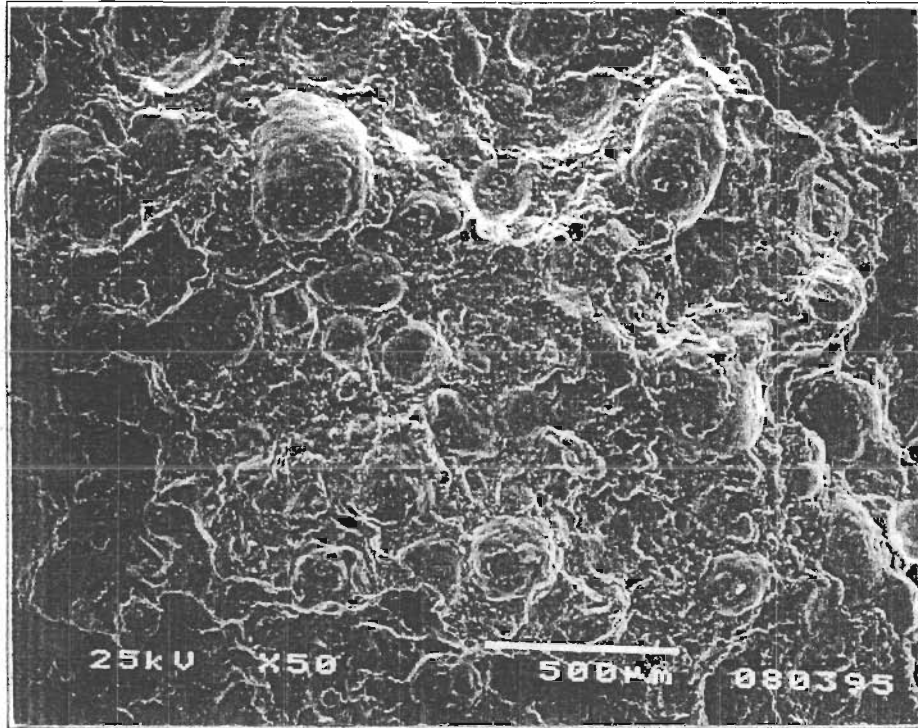
# Objectives

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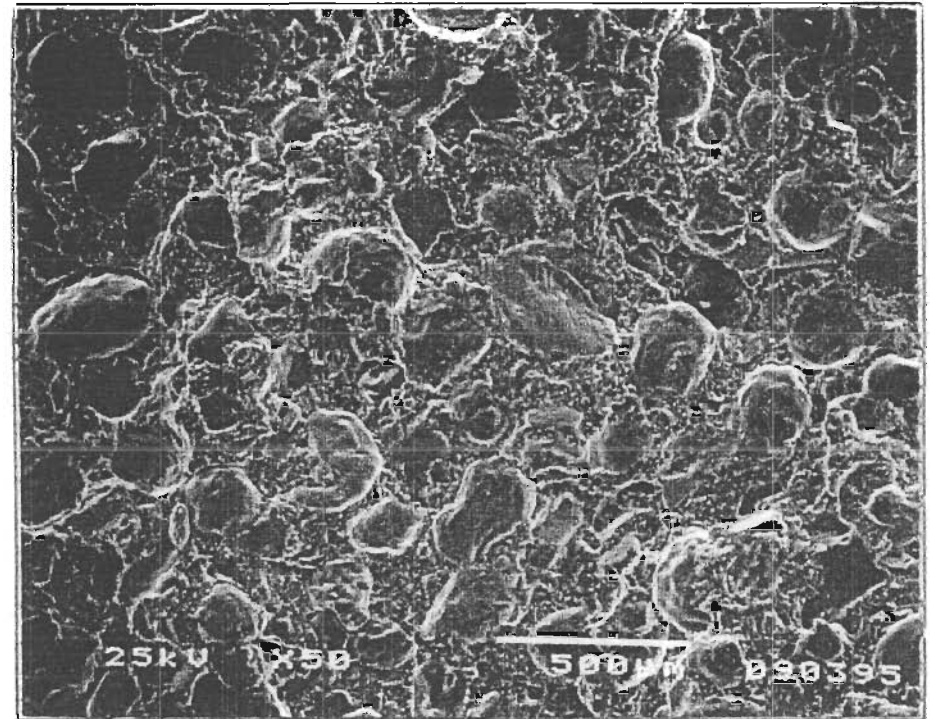
- **Investigate the Effect of Confining Pressure on the Crack Growth Behavior in the Material.**
- **Predict the Crack Growth Behavior in the Material.**



# Fracture Surface Under Different Confining Pressures



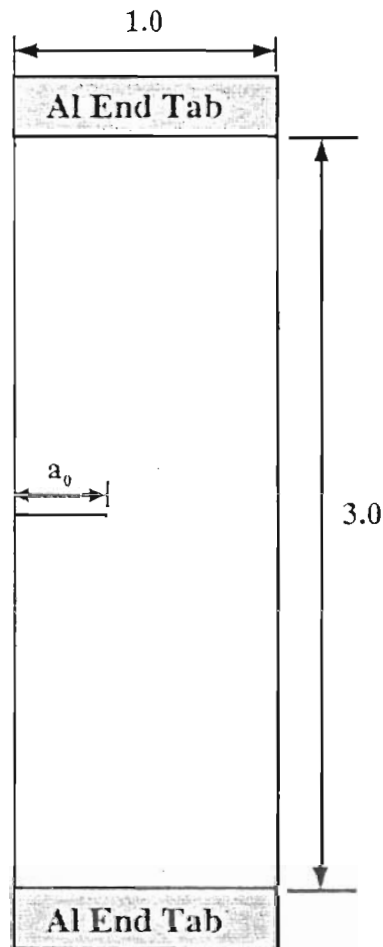
Pressure = 72.7 psi



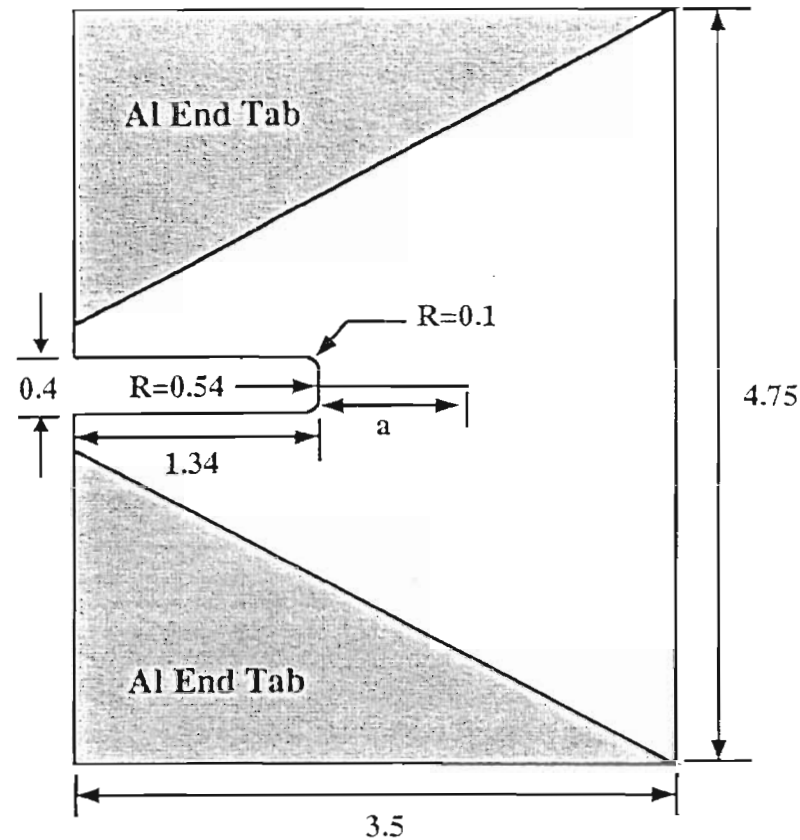
Pressure = 1744 psi



# Specimen Geometry



**Uniaxial  
Specimen**



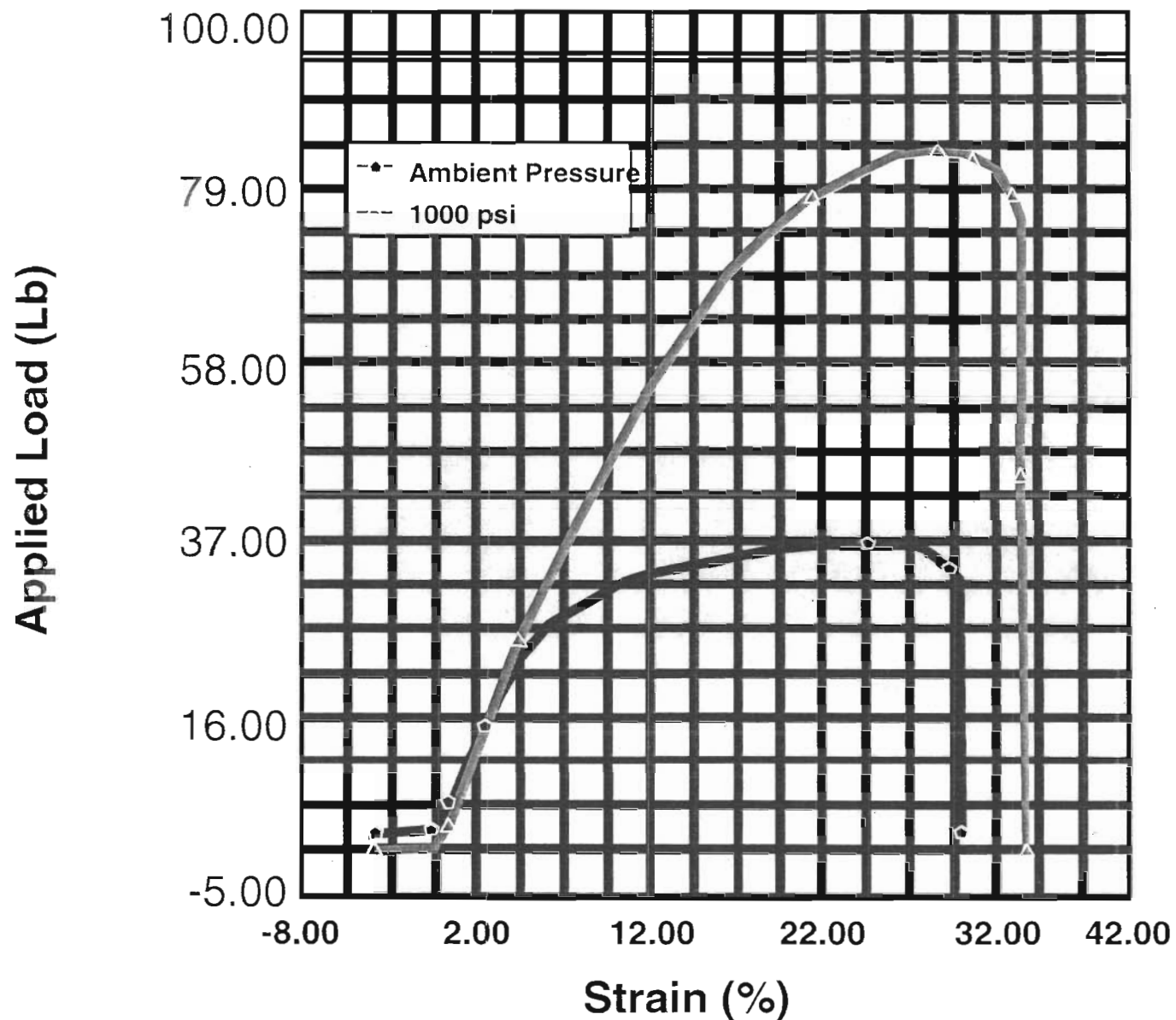
**Wedge  
Specimen**

(all dimensions in inches)

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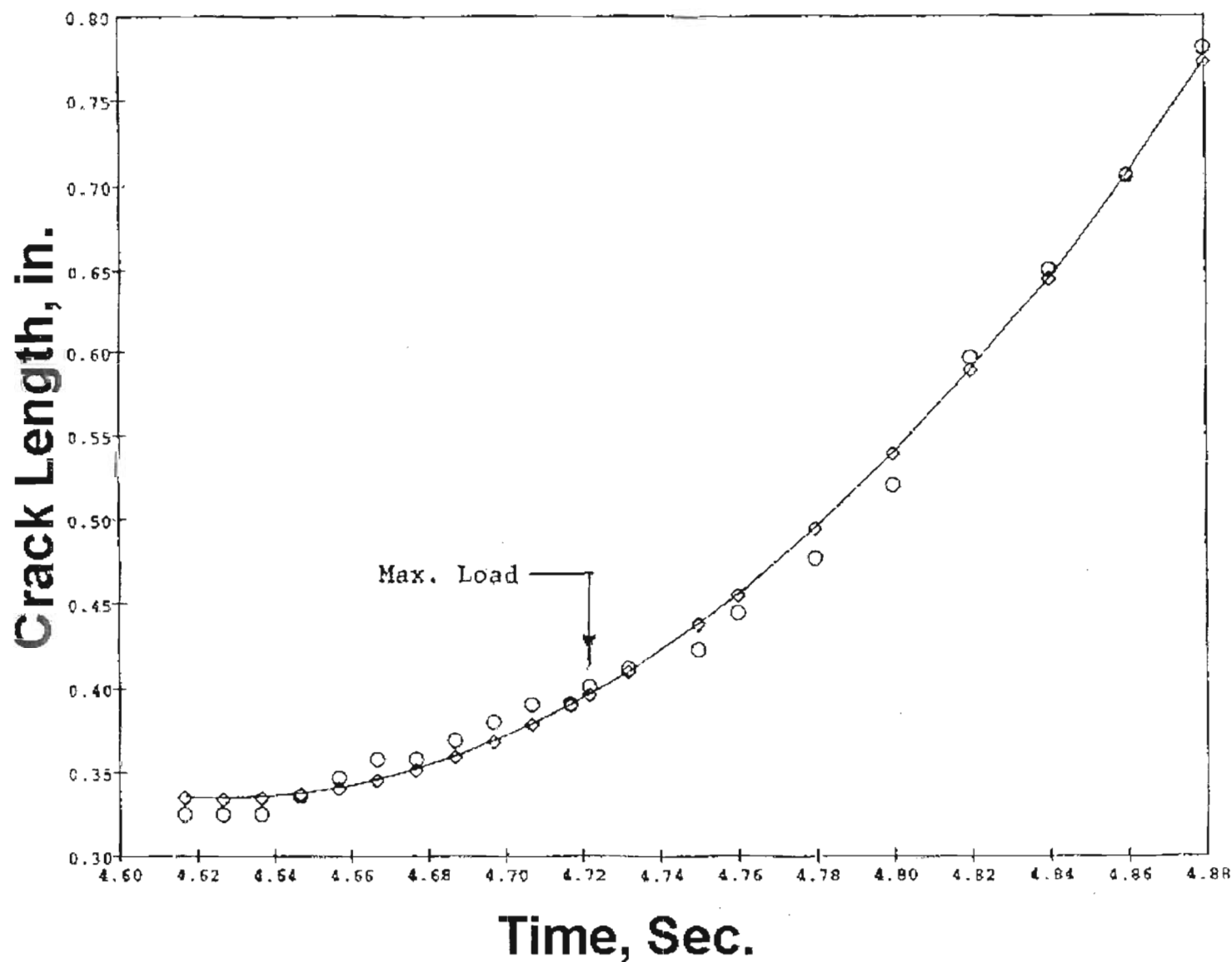


# Applied Load Vs. Strain



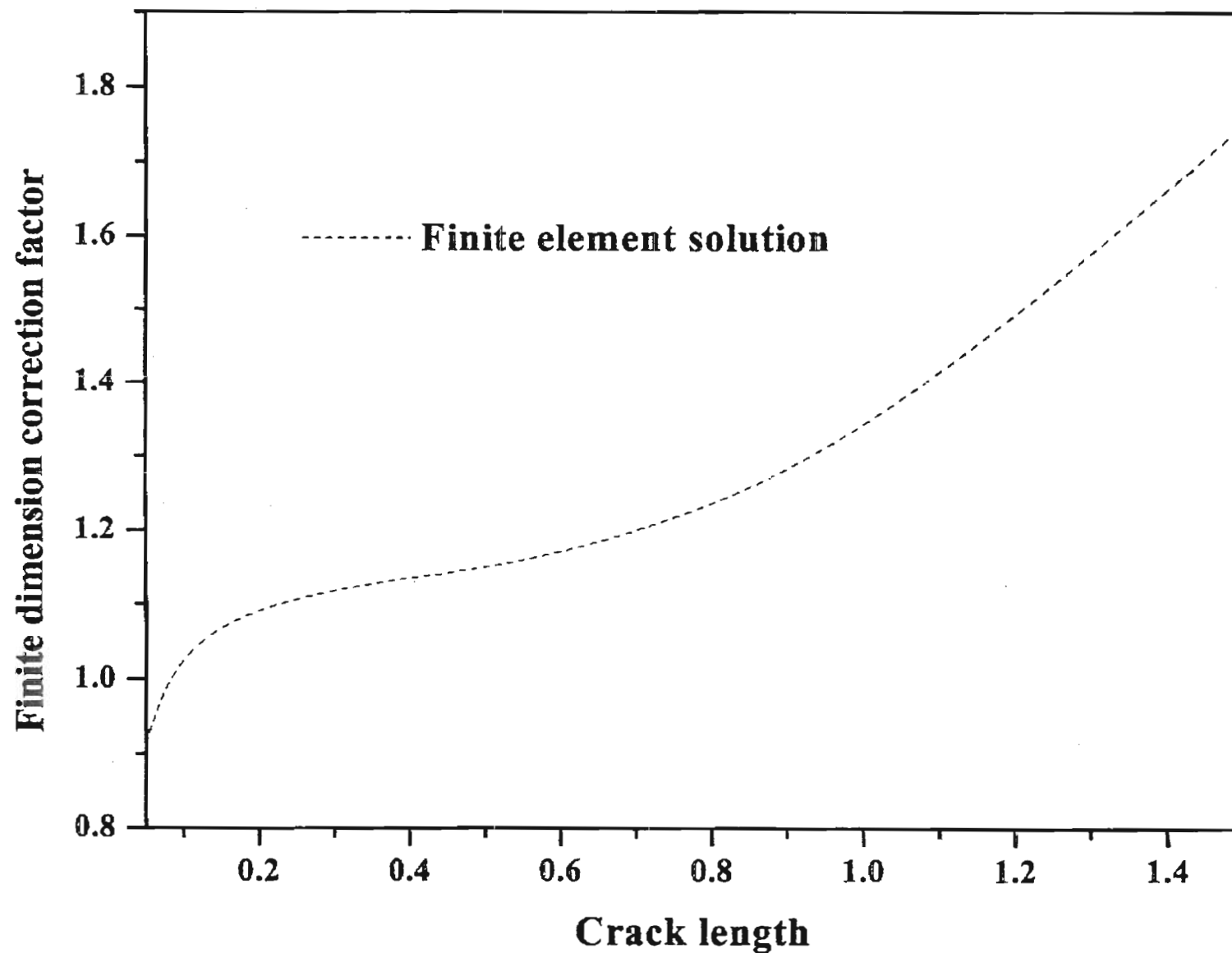
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# Crack Length Vs. Time Curve



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# Finite Dimension Correction Factor versus Crack Length (Poisson's Ratio = 0.49)

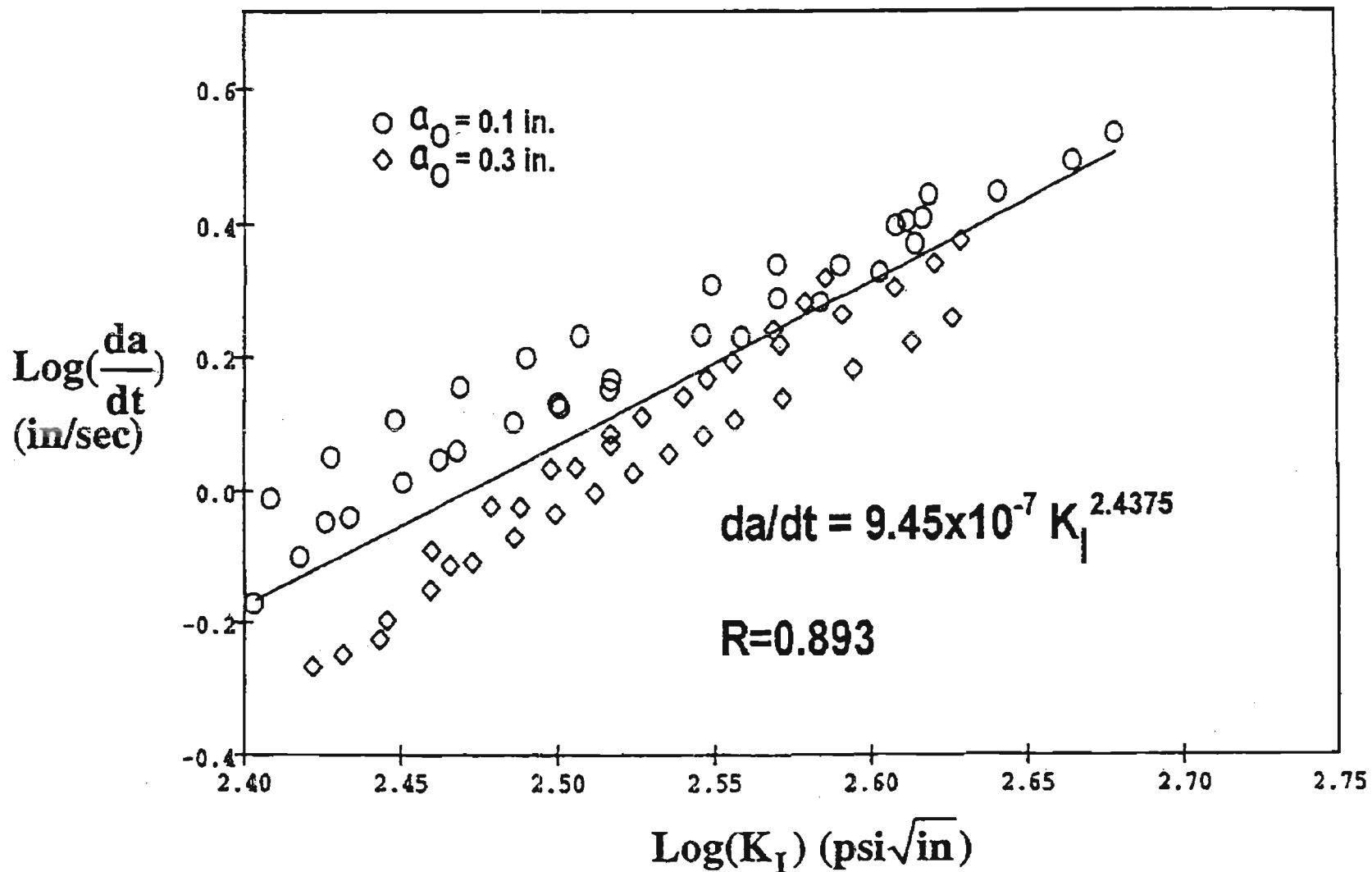


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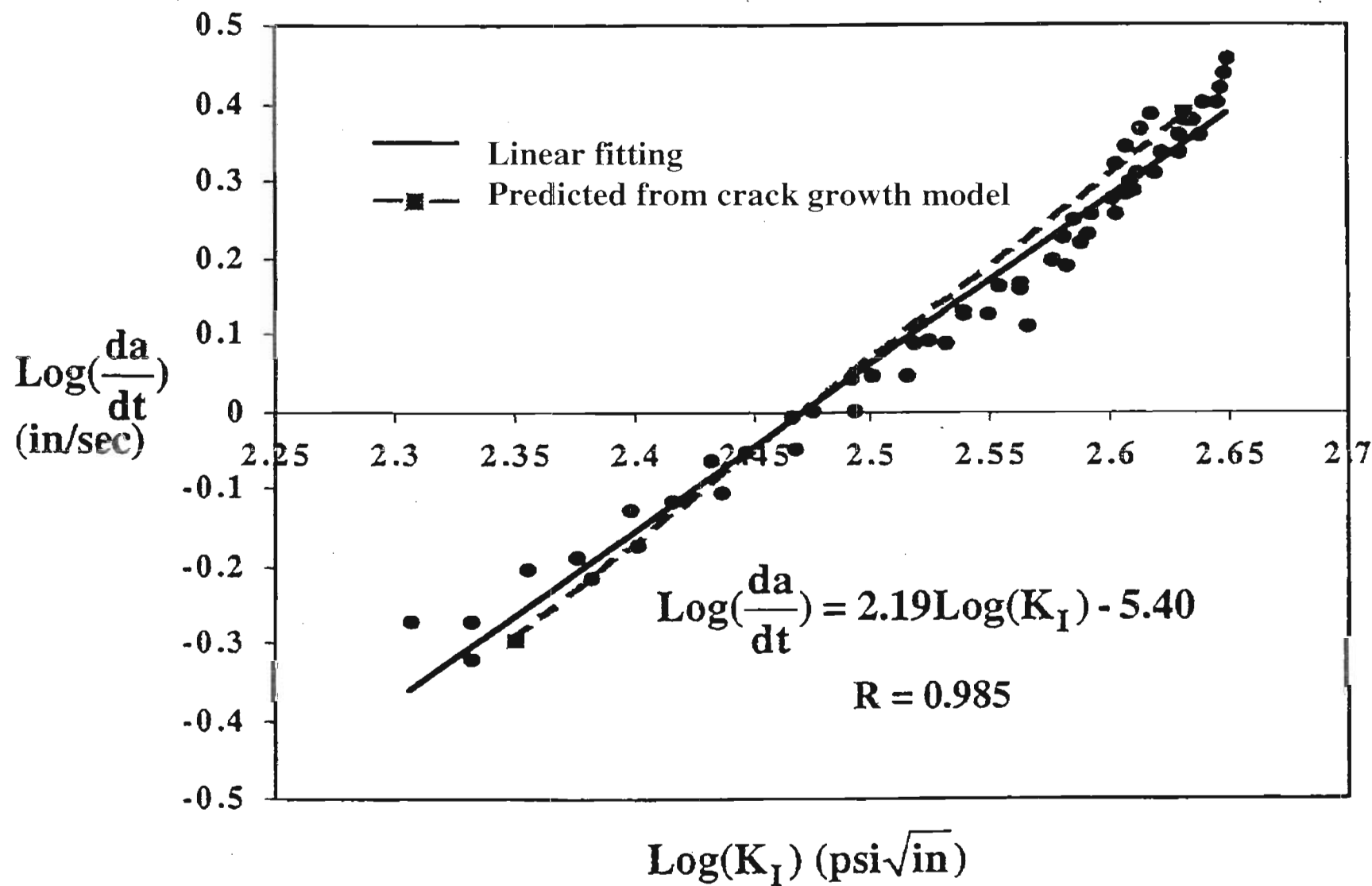


# Crack Growth Rate versus Mode I Stress Intensity Factor (Uniaxial Specimen)



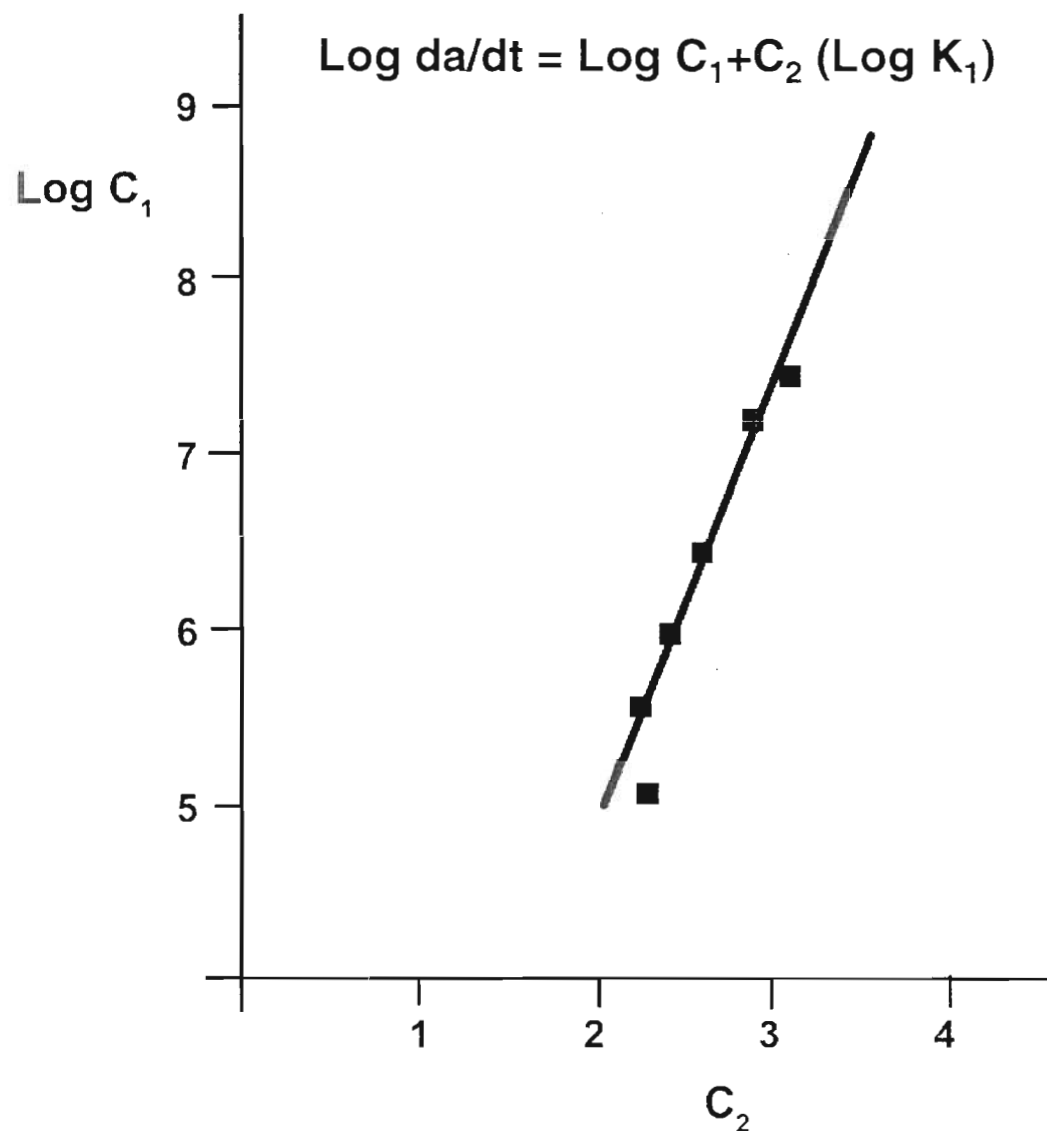


# Crack Growth Rate versus Mode I Stress Intensity Factor (Wedge-Shaped Specimen)





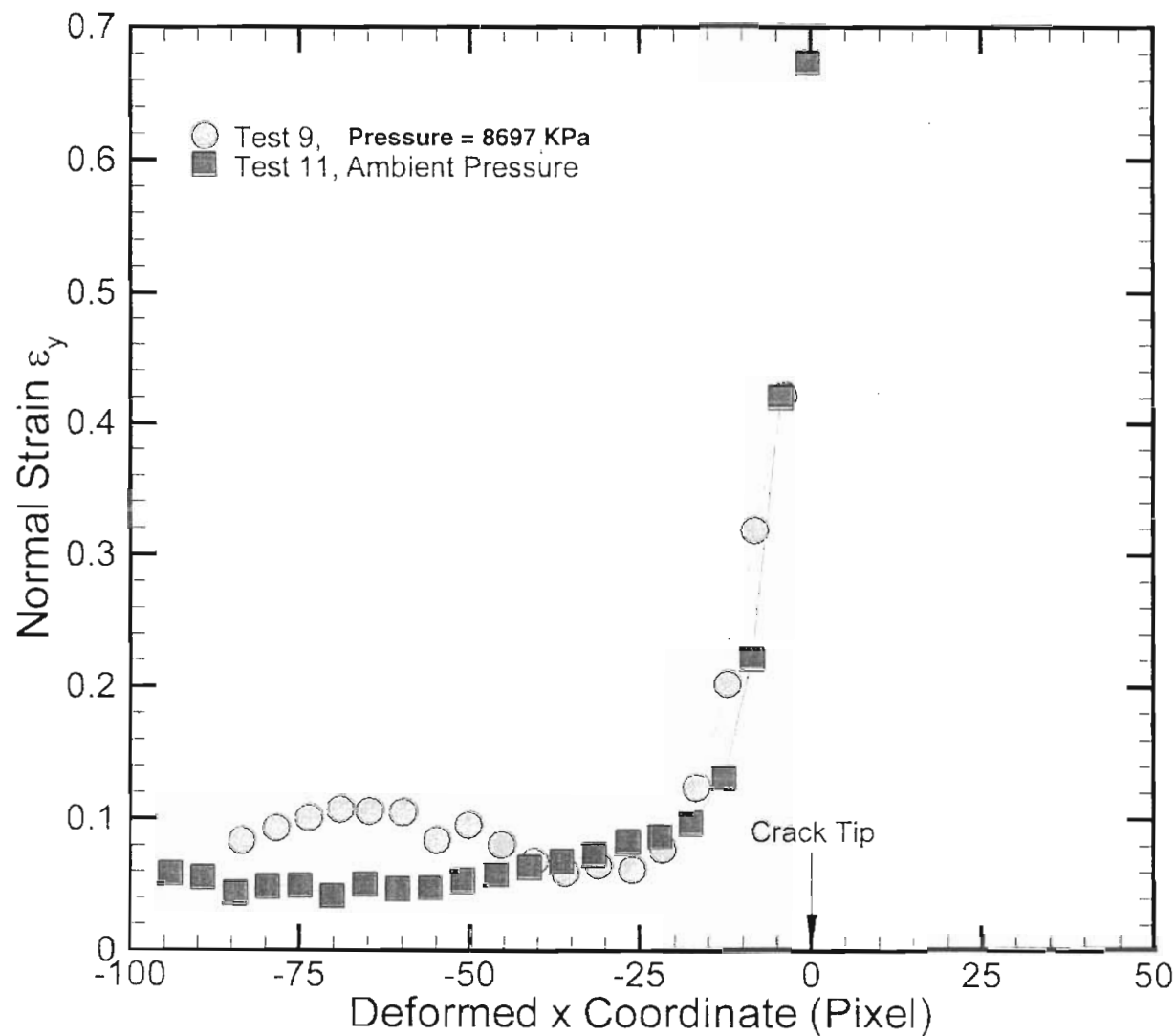
# Log $C_1$ versus $C_2$



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# Normal Strain Distribution Ahead of the Crack Tip at the Onset of Crack Growth





# Conclusions



- Under the confining pressure, the crack grows stably until the specimen fractured.
- A Power law relationship exists between the crack growth rate and the Mode I stress intensity factor.
- A good correlation exists between the predicted and the measured crack growth rate.